

Opener

- i) Find the vertex of the following function by completing the square

$$f(x) = 2x^2 + 10x - 7$$

- ii) Find the roots of the following function $f(x) = 3x^2 + 2x - 7$

Mar 24-8:14 AM

Opener

Find the vertex of the following function by completing the square

$$f(x) = 2x^2 + 10x - 7$$

$$f(x) = 2\left(x^2 + 5x - \frac{7}{2}\right) = 2\left(x^2 + 5x + \frac{25}{4} - \frac{25}{4} - \frac{7}{2}\right) = 2\left(x + \frac{5}{2}\right)^2 - \frac{25}{2} - 7 = 2\left(x + \frac{5}{2}\right)^2 - \frac{39}{2}$$

Find the roots of the following function $f(x) = 3x^2 + 2x - 7$

$a = 3$
 $b = 2$
 $c = -7$

$$-b \pm \sqrt{b^2 - 4ac}$$

$$\frac{-2 \pm \sqrt{2^2 - 4(3)(-7)}}{2(3)}$$

$$\frac{-2 \pm \sqrt{4 + 84}}{6}$$

$$\frac{-2 \pm \sqrt{88}}{6}$$

$$\frac{-2 \pm 9.4}{6}$$

$= 1.2$ $= -1.9$

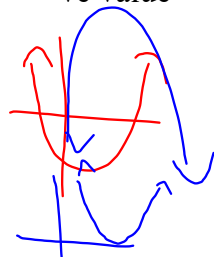
$(1.2, 0)$ $(-1.9, 0)$

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4.4 Discriminant p227

$$b^2 - 4ac = +ve \text{ value}$$

2 real roots



- ii) $b^2 - 4ac = 0$
1 real root

$$x^2 - 6x + 9 = 0 \quad (x - 3)^2 = 0 \quad \text{Perfect Squares}$$

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4.4 p 227
Discriminant

ii)



$$b^2 - 4ac = -ve$$

no solution

$$\sqrt{b^2 - 4ac}$$

no real roots

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Determine the # of roots for each equation

a) $4x^2 - 10x + 5 = 0$

$$D = b^2 - 4ac$$

$$a = 4 \quad = (-10)^2 - 4(4)(5)$$

$$b = -10 \quad = 100 - 80$$

$$c = +5 \quad = 20$$

∴ 2 real roots

ii) $3x^2 + 5 = 0$

$$a = 3$$

$$b = 0$$

$$c = 5$$

$$D = b^2 - 4ac$$

$$= 0^2 - 4(3)(5)$$

$$= 0 - 60$$

$$= -60$$

No Real Roots



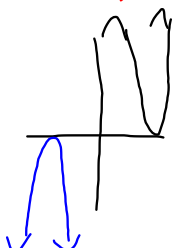
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$$4x^2 - 20x + 25$$

$a = +4$ $b^2 - 4ac$
 $b = -20$ $(-20)^2 - 4(4)(25)$
 $c = +25$ $400 - 400$
 $= 0$

\therefore 1 real root



Oct 16-10:18 AM

For what value of k does $2x^2 + 4x + k = 0$ have two distinct roots, one solution? and no solution?

One Solution

$$\begin{aligned}
 a &= 2 & 0 &= b^2 - 4ac \\
 b &= 4 & 0 &= 4^2 - 4(2)(k) \\
 c &= k = (?) & 0 &= 16 - 8(k) \\
 & & -16 &= -8k \\
 & & \frac{-16}{-8} &= \frac{-8k}{-8} \\
 & & 2 &= k
 \end{aligned}$$

K is greater than 2 - no solutions

K is less than 2 - two solutions

K=2 - one solution

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p 232-233

Hwk

q.2, 4 (odds) 6, 7, 8, 13

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